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File Code: 3400
Date: June 5, 2001

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This letter describes the existing conditions of southwestern dwarf mistletoe of ponderosa pine in the Malay Gap analysis area. The site level vegetation information from intensive stand examinations you provided, aided this assessment. I have also been to the Malay Gap area several times over the past 12 years.

Affected Environment

Individual tree dwarf mistletoe ratings (DMR's) are based on Hawksworth's 6-point dwarf mistletoe rating system. Dwarf mistletoe ratings for a site are the computed average of all individual tree ratings, including zero ratings of uninfected trees. DMR site ratings were divided into the following categories:

None: No infection.
Low: DMR is ranging from 0.1 to 0.5.
Moderate: DMR is ranging from 0.6 to 1.0.
High: DMR is ranging from 1.1 to 2.0.
Very High: DMR is ranging from 2.1+.

Seventy-seven percent of the sites in the Malay Gap analysis area are infected with dwarf mistletoe (DM) (Table 1). Seventy-two percent of the sites have low to moderate levels of DM infection, while only five percent have high to very high infection levels. Since dwarf mistletoe infection is often patchy within a site, it is inaccurate to interpret all acres as having an even distribution of mistletoe. For example, within a lightly infected site there may be areas with heavy infection and areas where infection is absent.

Although 77% of the sites have some level of infection, this percentage falls within range of many assessments I am familiar with in the ponderosa pine type in Arizona, where anywhere from 25% to 93% of the sites within an area had some level of infection. The fact that most of the infection levels are in the low to moderate range may reflect the forestry departments past activities in Malay Gap where they have attempted to treat infected sites.

Table 1. Number and percentage of sites infected with dwarf mistletoe in the Malay Gap Analysis Area, out of 84 sites surveyed.			
DMR Level	**Number of Sites**	**Percentage**	**Acres (approx.)**
None	**19**	**23**	**950**
Low	**49**	**58**	**3000**
Moderate	**12**	**14**	**500**
High	**4**	**5**	**150**
Very High	**0**	**0**	**40**
Total with infection	**65**	**77**	

Dwarf mistletoes are the most prevalent disease causing agents in Southwestern forests. They are parasitic, seed-bearing plants that depend on their hosts almost completely for water and nutrients. They are also host specific, i.e., the species that infects ponderosa pine does not infect Douglas fir and vice versa. Dwarf mistletoes have coevolved with their hosts for millions of years and are thus natural components of many forest ecosystems. As parasites, dwarf mistletoes cause significant changes in physiological processes and structural characteristics of infected trees. This results in changes in the structure and functions of forest communities. Overall effects on forest structure in a site which has been infected for many generation include: stand openings, lower crown canopy, denser canopy due to witches' brooms and fewer large trees.

Dwarf mistletoes have also been shown to provide forage for some species of birds and mammals, and the witches' brooms they cause serve as excellent nest sties for wildlife species too. As dwarf mistletoes kill groups of trees, the microclimate and vegetation composition of the openings are affected. Some of these changes in forest structure brought about by DM can be beneficial to some wildlife species.

Wildfires are one of the primary ecological factors in determining the distribution and intensity of dwarf mistletoes in unmanaged coniferous forests. Relatively complete burns tend to have a sanitizing effect on infected stands, while partial burns can lead to rapid infection of regeneration if scattered infected trees remain following the fire. In some studies, infected trees have been shown to suffer more crown scorch than healthy trees because they had flammable witches' brooms and lower crowns.

The Forestry Department has emphasized even-aged management and broadcast burning in the Malay Gap area over the past few decades. These regimes seem to be working and should be continued where dwarf mistletoe infection occurs and ponderosa pine exists as a monoculture in the area.

If you have any questions, please call (520) 556-2075.

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